An All Electronic, Adaptive, Focusing Schlieren System for Flight Research, Phase II

Completed Technology Project (2009 - 2011)

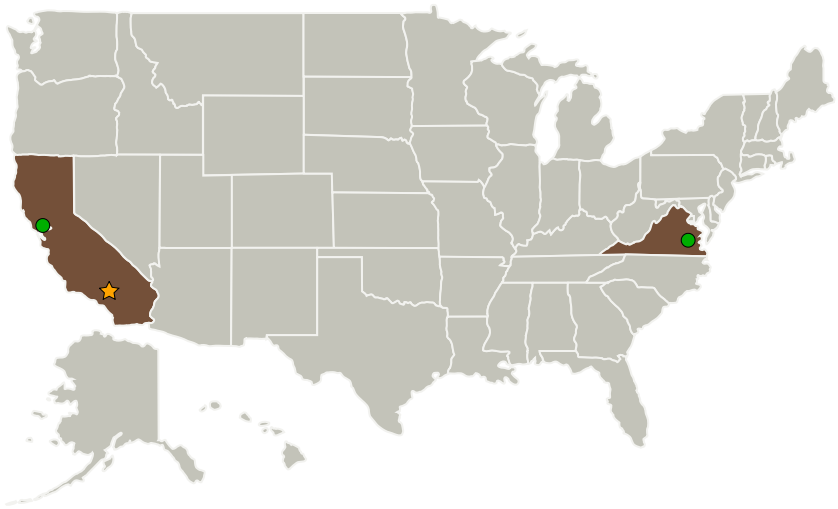
Project Introduction

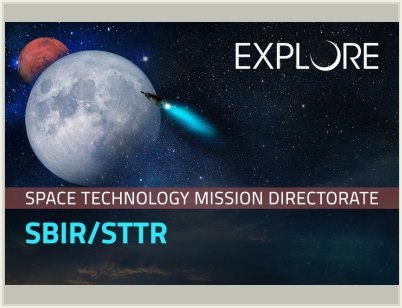
Visualization of turbulence and shock phenomena by schlieren imaging has led to important discoveries in aerodynamics, and there has been much interest in applying schlieren methods for aircraft in flight. The goal of this project is to develop the next generation of Schlieren for Aircraft in Flight (SAF) systems.

Anticipated Benefits

Flight testing is often used as a final critical check of aerodynamic designs developed by computational and wind tunnel methods because the information obtainable in wind tunnels is subject to interference. Outdoor schlieren systems using the sun and moon make it possible to examine shock waves and other phenomena from aircraft in flight. Applications exist in all forms of research and development associated with turbulent flow fields, including aero optics, flow control, drag, boundary layer transition, and flow separation. The proposed developments will be extremely important in flight-testing, where few such instruments can perform in a flight environment. Potential commercial applications include aero-optics, flow diagnostics, flow-control, free-space laser communication, active laser imaging, high bandwidth video transmission, spectroscopy, and high-resolution imaging.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
MetroLaser, Inc.	Supporting Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Laguna Hills, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

February 2009: Project Start

August 2011: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Gary C Jahns

Principal Investigator:

Drew L'esperance

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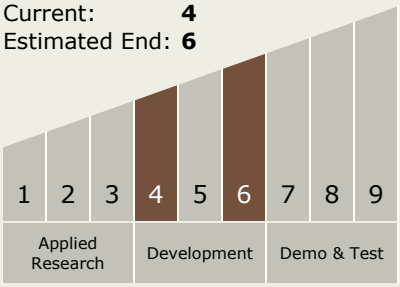
Technology Maturity (TRL)

Start: **4**
Current: **4**
Estimated End: **6**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.1 Aerodynamics